

### ABSTRACT OF THE DISCLOSURE

A cellular diagnostic array has been developed that provides accurate and reproducible measurements of the physical parameters of individual cells *en masse*, including cell membrane surface area, cell volume, and excess membrane. Three differing patterns are employed. In the first design, a gradient array having rectangular shaped channels is used to capture cells and readily show the ratio of volume to surface area for the captured cell. The second silicone rubber array provided by the present invention employs an array of wedge shaped pipettes, each of which captures an individual cell. The position of the cell within a wedge is enough to rapidly determine the cell's actual surface area and volume. A third type of cellular diagnostic array according to the present invention employs an array of channels designed to deform a cell to study how well the cell responds to repeated deformations.